REMARKS

By this Amendment, Claims 1, 8, 10, 21, 30, 31 and 35 have been amended, and Claims 23 and 32 have been canceled without prejudice to or disclaimer of the subject matter recited therein, thereby leaving Claims 1, 3-10, 21, 25, 27, 30, 31 and 33-36 pending in the application. Claim 31 stands withdrawn from consideration as allegedly being directed to non-elected subject matter. Reconsideration of the May 25, 2004 Official Action is respectfully requested in light of the following.

Restriction Requirement

The Official Action asserts that the elastomeric material recited in Claim 8, which is directed to a plasma etch reactor (i.e., a combination) is different from the elastomeric material recited in Claim 31, which is directed to an electrode (i.e., a sub-combination). Claims 8 and 31 have been amended so that both claims recite an electrically conductive elastomeric material including an electrically conductive filler where the elastomeric material is in the form of thin beads. Using the same symbols that are discussed at page 17 of the Official Action, the relationship between the subject matter recited in amended Claims 8 and 31 is ABcf,tb/Bcf,tb. Applicants submit that the basis for the restriction requirement stated at page 17 of the Official Action has been obviated by the amendments to Claims 8 and 31. Accordingly, withdrawal of the restriction requirement is respectfully requested.

Rejection Under 35 U.S.C. § 112, ¶1

Claims 1, 3-10, 21, 23, 25, 27, 32, 34 and 35 stand rejected under 35 U.S.C. § 112, ¶1. The reasons for the rejection are stated on page 2 of the Official Action. Additional remarks are set forth at pages 17-19 of the Official Action. Claims 23 and 32 have been cancelled.

Claim 1 recites the feature of "the electrode having a thickness of about 0.3 inch to 0.5 inch." The Official Action maintains the position that the specification fails to provide support for this feature. At page 19, first paragraph of the Official Action, it is asserted that:

> [A]s evidenced by Degner ..., conventional electrode thicknesses usually range from 0.039 to 0.787 inches, which clearly includes the recited conventional and claimed electrode thickness ranges, and therefore, it appears to be improper to rely on specific portions of a wide range of values from a referenced patent in order to overcome an incomplete original filed application as required by 35 U.S.C. 112, first paragraph. (Emphasis added).

In the Amendment filed on March 2, 2004, Applicants explained why the descriptions at (1) page 1, lines 8-10 and (2) page 6, lines 26-29 of the present specification each support the subject matter recited in Claim 1 according to legal precedent and the relevant patent examining procedures set forth in the MPEP. Applicants' remarks pertaining to this rejection that were presented in the March 2 Amendment are incorporated herein by reference. Applicants submit that their remarks have not been properly answered in the Official Action. Accordingly, reconsideration of those remarks is respectfully requested in light of the following.

A. Degner Has Been Incorporated By Reference at Two Separate Locations in the Present Specification

First, Degner has been incorporated by reference in the present application by the following statement at page 1, lines 8-10 of the specification:

> Electrodes used in plasma processing reactors for processing semiconductor substrates such as a silicon wafers are disclosed in U.S. Patent Nos. 5,074,456 [i.e., Degner] and 5,569,356, the disclosures of which are hereby incorporated by reference. (Emphasis added).

Second, Degner has been incorporated by reference in the present application by the following statement at page 8, lines 8-17 of the present specification:

> Alternatively, the electrode can be metallurgically or adhesively bonded to a support by any suitable technique such as that described in commonly owned U.S. Patent No. 5,074,456 to Degner et al., the disclosure of which is incorporated by reference. (Emphasis added).

However, the Official Action fails to acknowledge the statement regarding Degner at page 1, lines 8-10 of the specification.

B. The Patent Office is Required to Answer Applicants' Arguments

MPEP § 707.07(f) (page 700-119, May 2004) states that "[w]here the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it" (emphasis added). Applicants submit that the Official Action has failed to follow these patent examining procedures.

C. Legal Precedent Supports Applicants' Position

Applicants cited Ultradent Products Inc. v. Life-Like Cosmetics, 44 USPQ2d 1336 (Fed. Cir. 1997), as legal precedent that supports their position that Degner has been incorporated by reference in its entirety in the present application. Particularly, in Ultradent Products, the Court of Appeals for the Federal Circuit decided that the phrase "which patent is hereby incorporated by reference" has the effect of incorporating the entire contents of the patent in the referencing patent. The Federal Circuit refuted the argument that only the portion of the contents of the incorporated patent that is specifically referred to in the referencing patent is incorporated by reference therein.

Ultradent Products directly supports Applicants' argument that the entire disclosure of U.S. Patent No. 5,074,456 to Degner et al. ("Degner") has been incorporated by reference in the present specification, and thus the claimed feature of "the electrode having a thickness of about 0.3 inch to 0.5 inch" is supported by the present specification. However, the Official Action fails to address Applicants' position regarding Ultradent Products and continues to assert that only certain portions of Degner's disclosure, and not Degner's entire disclosure, have been incorporated by reference. Applicants respectfully request that their position supported by Ultradent Products be addressed.

Moreover, even applying the reasoning set forth in the Official Action, at the least, any and all disclosure in Degner regarding electrodes used in plasma processing reactors for processing semiconductor substrates has been incorporated by reference in the present specification by the statement at page 1, lines 8-10 of the present specification that "[e]lectrodes used in plasma processing reactors for

processing semiconductor substrates such as a silicon wafers are disclosed in ... [Degner] ..., the ... [disclosure] of which ... [is] hereby incorporated by reference." Applicants submit that this disclosure necessarily includes the dimensions of the electrode assembly shown in TABLE 2 at column 5 of Degner. These dimensions fully support the recitation of "the electrode having a thickness of about 0.3 inch to 0.5 inch" in Claim 1. Accordingly, the rejection is improper for this additional reason.

D. The MPEP Supports Applicants' Position

The Official Action has failed to address the argument presented in the paragraph bridging pages 9 and 10 of the October 7, 2003 Amendment (which is incorporated herein by reference) that the entire disclosure of Degner has been incorporated by reference in the present specification pursuant to the provisions of MPEP § 201.06(c)(page 200-25 of May 2004 revision). Namely, the MPEP states that an applicant may incorporate by reference a prior application by including a statement that such application is "herby incorporated herein by reference." Although the MPEP supports Applicants' position that Degner has been incorporated by reference in its entirety at two separate locations of the present specification, the Official Action has failed to address Applicants' position.

E. Any Disclosure in Degner Has Been Incorporated by Reference

As explained above, the entire disclosure of Degner has been incorporated by reference in the present application. The entire disclosure of Degner necessarily includes any of its disclosure. The Official Action cites no authority to support the allegation that "it appears to be improper to rely on specific portions of a wide range of values from a referenced patent in order to overcome an incomplete original filed

application as required by 35 U.S.C. 112, first paragraph" (emphasis added). Moreover, the originally filed application is not incomplete. Rather, for the reasons stated above, the subject matter recited in each and every pending claim is fully supported by the originally filed application.

For the foregoing reasons, the Official Action has improperly failed to answer the substance of all of the arguments that Applicants presented in the March 2 Amendment that pertain to this rejection. Applicants respectfully request that those arguments be considered along with the arguments presented herein. Withdrawal of the rejection under 35 U.S.C. § 112, ¶1, is respectfully requested by Applicants.

Art Rejections

First Rejection of Claims 1, 4-10, 21, 23, 25 and 27-30 Under 35 U.S.C. § 103

Claims 1, 4-10, 21, 23, 25, 27 and 30 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,074,456 to Degner et al. ("Degner") in view of JP 2-20018 ("Murai"). The reasons for the rejection are stated on pages 3-5 of the Official Action. Claim 23 has been cancelled. This rejection is respectfully traversed.

Claim 1, as amended, recites "a low resistivity silicon electrode adapted to be mounted in a plasma reaction chamber used in semiconductor substrate processing, comprising: a silicon electrode comprising a showerhead electrode having a plurality of gas outlets arranged to distribute process gas in the plasma reaction chamber during use of the showerhead electrode, the electrode having a thickness of about 0.3 inch to 0.5 inch and an electrical resistivity of less than 1 ohm-cm ... and a graphite backing ring elastomer bonded to the electrode" (emphasis added). Support for the amendment to Claim 1 is provided, for example, at page 9, lines 19-

22 of the specification, and in Figures 6 and 7, which show a showerhead electrode assembly 240 including a backing ring 212.

Independent Claim 21, as amended, recites "a low resistivity silicon electrode adapted to be mounted in a plasma reaction chamber used in semiconductor substrate processing, comprising: a silicon electrode comprising a showerhead electrode having a plurality of gas outlets arranged to distribute process gas in the plasma reaction chamber during use of the showerhead electrode, the gas outlets having a diameter of about 0.025 inch to 0.030 inch, the electrode having a thickness of about 0.3 inch to 0.5 inch and an electrical resistivity of less than 1 ohm-cm ... and a backing ring elastomer bonded to the electrode" (emphasis added).

Independent Claim 30, as amended, recites "a low resistivity silicon electrode adapted to be mounted in a plasma reaction chamber used in semiconductor substrate processing, comprising: a silicon electrode comprising a showerhead electrode having a plurality of gas outlets arranged to distribute process gas in the plasma reaction chamber during use of the showerhead electrode, the electrode having a thickness of about 0.375 inch to 0.5 inch and an electrical resistivity of less than 1 ohm-cm ... and a graphite backing ring elastomer bonded to the electrode" (emphasis added). The combination of Degner and Murai fails to suggest the subject matter recited in Claims 1, 21 and 30 for the following reasons.

The Official Action states that Degner discloses a single crystal silicon electrode 12 adapted to be mounted in a parallel plate plasma reaction chamber, and further that the electrode has a thickness in the range of from about 0.1 cm to 2 cm. The Official Action acknowledges that Degner does not disclose that the

electrode is a single crystal silicon electrode having an electrical resistivity of less than 0.05 ohm-cm, as recited in Claim 1.

However, the Official Action alleges that Murai discloses a single crystal silicon electrode adapted to be mounted in a parallel plate plasma reaction chamber and having an electrical resistivity of less than 0.05 ohm-cm. The Official Action further alleges that it would have been obvious to modify Degner's apparatus to include an electrode having such electrical resistivity. Applicants respectfully disagree with these assertions.

Applicants respectfully submit that the combination of Degner and Murai fails to suggest a silicon electrode that comprises a showerhead electrode and includes the combination of features recited in any one of independent Claims 1, 21 and 30.

Degner discloses that the electrode 12 can have a thickness falling within the range of from about 0.1 cm to 2 cm (0.04 in to 0.79 in). This thickness range encompasses "conventional" electrodes that have a thickness of 0.25 inch and less. Degner does not suggest that thick electrodes having a thickness of about 0.3 inch to 0.5 inch, as recited in Claims 1 and 21, or a thickness of about 0.375 inch to 0.5 inch, as recited in Claim 30, can provide the unexpected results described below as compared to such conventional electrodes. Degner also fails to suggest that the electrode has an electrical resistivity of less than 0.05 ohm-cm, as recited in Claim 1.

Murai is silent regarding the thickness of the upper electrode 2a and thus cannot suggest selecting any particular portion of Degner's disclosed thickness range of 0.04 in to 0.79 in, much less the thickness range of about 0.3 inch to 0.5 inch, as recited in Claims 1 and 21, or the thickness range of about 0.375 inch to 0.5 inch, as recited in Claim 30.

A. The Claimed Subject Matter Provides Unexpected Superiority Over Conventional Thickness Electrodes

The Hubacek Declaration submitted with the Amendment filed on October 7, 2003, provided evidence of the unexpected superiority of the claimed subject matter as compared to the prior art; namely, the claimed low resistivity, silicon electrode provides (a) a reduced center-to-edge temperature gradient; (b) an increased lifetime; (c) reduced byproduct deposition behind the electrode; and (d) reduced electrical resistance.

B. Reduction of Center-to-Edge Temperature Gradient of Electrode and Improvement of Showerhead Electrode Lifetime

The Hubacek Declaration explained that low resistivity, single crystal silicon showerhead electrodes having respective thicknesses of 0.15 inch, 0.18 inch, 0.25 inch, and 0.35 inch were compared. The comparative results plotted in the graph in Appendix A attached to the Hubacek Declaration show that for each applied power level, the center-to-edge temperature gradient decreases as the showerhead electrode thickness increases. Reducing the temperature gradient surprisingly reduces the probability of cracking of the electrode, especially at high power levels, such as 4000 watts. Because Degner and Murai both fail to recognize the cracking problem that was solved by the claimed thicker electrode, these references could not have suggested a solution to this problem. See In re Shaffer, 108 USPQ 326, 329 (CCPA 1956).

The Hubacek Declaration also explained that increasing the showerhead electrode thickness increases the lifetime of the electrode, i.e., the number of RF

hours that the electrode can be operated for without failing, i.e., cracking. The relationship between showerhead electrode thickness and the power level applied to the electrode is plotted in the graph in Appendix B attached to the Hubacek Declaration. In this graph, Line A can be extrapolated to higher electrode thickness values to show that showerhead electrodes having a thickness of 0.30 inch or greater, e.g., 0.32 inch, 0.35 inch, 0.375 inch or even greater (and thus falling within the electrode thickness range recited in Claim 1) can be operated at significantly higher power levels without cracking than electrodes having a thickness of 0.25 inches or less, which is outside of the range recited in Claim 1. The prior art fails to recognize the unexpected advantage that thicker electrodes can be operated at higher power levels without cracking than can thinner electrodes.

Despite these unexpected results, the Official Action asserts that:

> [T]he fact that a thicker electrode results in a decreased center to edge temperature gradient is an expected result rather than an unexpected result. The results shown are typical based on known physics and heat transfer laws. Furthermore, one would expect that a thicker electrode would be harder to crack since it is thicker. This is also an expected rather than an unexpected result.

The Official Action has asserted that U.S. Patent No. 5,993,596 to Uwai et al. ("Uwai") allegedly provides evidence that the test results in the Hubacek Declaration are "typical" and "expected" rather than unexpected. Applicants respectfully disagree with these assertions regarding Uwai.

Uwai discloses glassy carbon electrodes are known that are attached to a metal cooling plate in a plasma reactor. Uwai discloses that such electrodes can warp during plasma processing, and that such warp prevents close contact of the

electrode with a metal cooling plate attached to the back of the electrode (column 2, lines 52-61).

Uwai discloses glassy carbon electrodes that must have a thermal conductivity greater than 5 w/m·K at 300K, a bulk specific gravity greater than 1.53 g/cm^3, and a thickness greater than 4.5 mm (0.18 in) (column 4, lines 8-12).

Applicants submit that Uwai does not support the allegation in the Official Action that the results provided by the claimed thick electrode are expected rather than unexpected. First, Uwai does not disclose a silicon electrode. Accordingly, Uwai does not suggest that each of the required properties of the disclosed glassy carbon electrode, including its thickness, might also be suitable for a silicon electrode.

Second, Uwai discloses that warpage of the glassy carbon electrode is characterized by the formation of a small gap between the back of the electrode and the metal cooling plate. However, Uwai does not disclose that the glassy carbon electrodes are subject to cracking during plasma processing. Thus, Uwai does not suggest that the glassy carbon electrodes can provide the unexpected result of providing resistance to cracking, as is provided by the electrode recited in Claim 1.

Moreover, Claim 1 recites a silicon electrode including a silicon showerhead electrode elastomer bonded to a graphite backing ring, and not a glassy carbon electrode attached to a metal backing plate, as disclosed by Uwai. Applicants determined that the claimed thick silicon electrode can be elastomer bonded to a graphite backing ring that contacts the periphery of the back side of the electrode, as shown in the exemplary embodiment of the electrode depicted in FIG. 6. Applicants determined that the claimed thick silicon electrode affects the temperature gradient

across the electrode such that the level of tensile stress at the periphery of the electrode, at which the electrode contacts the graphite backing ring, is reduced.

In contrast, Uwai's glassy carbon electrode assembly is designed specifically to provide close contact across the back surface of the electrode with the metal cooling plate such that heat transfer occurs across the back surface. Uwai does not suggest that a thick electrode of silicon elastomer bonded to a graphite backing ring, as recited in Claim 1, can provide the unexpected results that were described in the Hubacek Declaration.

Thus, Applicants submit that Uwai fails to support the allegation in the Official Action that the test results in the Hubacek Declaration are "typical" and "expected" rather than unexpected. Therefore, it is submitted that Uwai fails to cure the deficiencies of Degner and Murai with respect to the claimed electrode.

C. Reduction of Byproduct Deposition Behind Electrode and Reduction of Electrical Resistance of Electrode

The Hubacek Declaration further explained that increasing the showerhead electrode thickness increases the length of the gas passages and also increases the pressure behind the electrode. The showerhead electrode having a thickness of 0.35 inch reduces backstreaming, i.e., the deposition of particle defects behind the electrode, as compared to the electrodes having a thickness of 0.15 inch, 0.18 inch, and 0.25 inch, which fall outside of the thickness range recited in Claims 1, 21 and 30. The prior art clearly fails to recognize the advantage of thicker electrodes in reducing by-product deposition.

The Hubacek Declaration also explained that increasing the thickness of the showerhead electrode decreases its electrical resistance. The Official Action has

asserted that page 120 of the publication "Silicon Processing for the VLSI Era, Volume 1: Process Technology," discloses that "it is an equation of physics that the resistance of the material is inversely proportional to the thickness of the material." However, the Hubacek Declaration further explained that reducing the impedance path of the RF provides for a higher etch rate of substrates in the plasma reactor at a set power level applied to the electrode and, surprisingly, the etch uniformity was as good as, or better than, a lower resistance electrode, e.g., a thinner electrode. These additional advantages are not recognized in the applied references.

However, regarding these further unexpected results, the Official Action asserts at page 18, lines 6-8, that "such statements are largely unsupported statements that are not backed up by supplementary evidence and therefore these statements are insufficient to establish unexpected results." As was explained in the March 2 Amendment, it is improper to evaluate the statements set forth at paragraphs 5 and 6 of the Hubacek Declaration regarding the reduction of byproduct deposition behind thick electrodes, and the reduction of electrical resistance of thick electrodes, individually for their ability to knockdown the *prima facie* case. Rather, the Patent Office should properly weigh these statements as part of the evidence as a whole.

Applicants respectfully submit that the comparative results provided in the Hubacek Declaration are sufficient to rebut the alleged *prima facie* case of obviousness based on the combination of Degner and Murai. Accordingly, it is respectfully submitted that the subject matter recited in Claim 1 is patentable.

Dependent Claims 4-10 and 27 are also patentable over the combination of Degner and Murai for at least the same reasons that Claim 1 is patentable.

Claims 21 and 30 also are patentable over the combination of Degner and Murai for reasons stated above. Dependent Claim 25 also is patentable over the cited combination of references for at least the same reasons as those stated for Claim 21.

Withdrawal of the rejection is therefore respectfully requested.

First Rejection of Claims 3 and 32-36 Under 35 U.S.C. § 103

Claims 3 and 32-36 stand rejected under 35 U.S.C. § 103(a) over Degner in view of Murai, and further in view of U.S. Patent No. 5,993,597 to Saito et al. ("Saito"). The reasons for the rejection are stated on pages 5-6 of the Official Action. Claim 32 has been cancelled. The rejection is respectfully traversed.

Claim 3 recites the feature of "the gas outlets have diameters of 0.020 to 0.030 inch and the gas outlets are distributed across the exposed surface." It is acknowledged in the Official Action that Degner and Murai fail to disclose the diameter of the gas outlets as recited in Claim 3. However, it is asserted that Saito teaches this omission and that it would have been obvious to modify Degner in view of Murai to achieve the claimed invention. Applicants respectfully disagree.

First, Saito fails to disclose or suggest an electrode thickness of about 0.3 inch to 0.5 inch. In contrast, Saito discloses that the silicon sheet had a thickness of only 5 mm (column 3, lines 13-20), which is less than 0.2 inches and thus significantly thinner than even a conventional 0.25 inch thick electrode. Accordingly, Saito teaches away from the combination of features recited in Claim 3, and the combination of Degner, Murai and Saito provides no motivation to select the particular thickness of Degner's electrode plate of about 0.3 inch to 0.5 inch, as

recited in Claim 1. Thus, dependent Claim 3 also is patentable over the combination of Degner, Murai and Saito for at least the same reasons that Claim 1 is patentable.

Also, Saito provides no motivation to select the particular thickness of Degner's electrode plate of about 0.375 inch to 0.5 inch, as recited in Claim 30. Thus, dependent Claim 33 also is patentable over the combination of Degner, Murai and Saito for at least the same reasons that Claim 30 is patentable.

Second, Murai not only fails to disclose the diameter of the gas outlets recited in Claim 3, but in fact does not even disclose a showerhead electrode that has such outlets. In contrast, in Murai's apparatus, gas is supplied into the chamber 5 through the gas supply tube 4 provided in the sidewall of the chamber. Thus, Murai provides no suggestion to modify Degner's electrode to include the combination of features recited in Claim 3.

Saito discloses a silicon sheet that includes holes having a diameter of only 0.5 mm (column 3, lines 13-20), which is less than the diameter of 0.200 inch to 0.300 inch, as recited in Claim 3.

Thus, the combination of Degner, Murai and Saito fails to suggest the combination of features recited in Claim 3.

Claims 34, 35 and 36 depend directly or ultimately from Claims 1, 21 and 30, respectively. Each of Claims 34-36 recites the features of "the gas outlets have a diameter of about 0.025 inch to about 0.028 inch." Saito discloses an electrode hole diameter of less than 0.200 inch, and thus provides no suggestion to modify Degner's electrode to include gas outlets having a diameter of about 0.025 to about 0.028 inch, as recited in Claims 34-36.

As stated at MPEP § 2143.03, page 2100-133 (May 2004 Rev.), "to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art" (citation omitted). Because the combination of Degner, Mura and Saito fails to disclose or suggest the combinations of features recited in Claims 3 and 34-36, the Official Action has not established a case of *prima facie* obviousness regarding the subject matter recited in these claims for this additional reason.

Therefore, withdrawal of the rejection is respectfully requested.

Second Rejection of Claims 1, 4-10, 21, 23, 25, 27 and 30 Under 35 U.S.C. § 103

Claims 1, 4-10, 21, 23, 25, 27 and 30 stand rejected under 35 U.S.C. § 103(a) over Murai in view of Degner. The reasons for the rejection are stated on pages 6-9 of the Official Action. Claim 23 has been cancelled. This rejection is respectfully traversed.

As explained above, Murai is silent regarding the thickness of the disclosed electrode. Degner does not suggest modifying Murai's electrode to result in the thick electrode having a thickness of about 0.3 inch to 0.5 inch, as recited in Claims 1 and 21, or a thickness of about 0.375 inch to 0.5 inch, as recited in Claim 30. Moreover, as explained above, the claimed thick electrode provides unexpected results.

Also, Degner discloses a *showerhead electrode assembly* 10 that has a different construction than Murai's apparatus, which does not include a showerhead electrode. The asserted modification of Murai's apparatus would require its substantial reconstruction and redesign and would substantially change its principle of operation. Furthermore, modifying Murai's silicon electrode by increasing its

thickness would not achieve the claimed subject matter, but would still result in a non-showerhead electrode. A showerhead electrode would be unsuitable for incorporation in Murai's apparatus because Murai's particular apparatus design uses a different electrode construction. Moreover, Claim 1 requires that the thick electrode is elastomer bonded to a graphite backing ring. Degner fails to suggest modifying Murai's electrode to include such backing ring.

Furthermore, Murai and Degner fail to suggest modifying Murai's plasma chamber to result in an electrode resiliently clamped to a support member by a clamping member," as recited in Claim 9, or to include the combination of features recited in Claim 10, in light of the different principle of operation of Murai's upper electrode, which is not a showerhead electrode.

For at least these reasons, the applied references do not render the claimed subject matter *prima facie* obvious.

It is asserted at page 21, first paragraph of the Official Action that "Degner et al. does not change the principle of operation of Murai since modifying Murai with Degner et al. would still allow for Murai to be used as an electrode consistent with the teachings of Murai" (emphasis added). However, Claims 1, 21 and 30 each recite a "showerhead electrode" and Murai's electrode is not a showerhead electrode. The Official Action has not stated sufficient motivation for one having ordinary skill in the art to undertake the substantial redesign that would be required to modify Murai's electrode to produce a showerhead electrode, especially because such resulting showerhead electrode still would be inappropriate for Murai's apparatus, which is designed to include a different electrode construction compatible with its gas supply system having a gas supply tube 4 for introducing gas through the

sidewall of the chamber. The asserted modification of Murai in view of Degner relies entirely on hindsight derived from Applicants' present disclosure.

Also, the unexpected results presented in the Hubacek Declaration that are achieved by the subject matter recited in Claim 1 rebut any alleged *prima facie* case of obviousness over the combination of Murai and Degner. Accordingly, Claim 1 also is patentable over the applied references. Therefore, withdrawal of the rejection is respectfully requested.

Dependent Claims 4-10 and 27 also are patentable over the combination of Murai and Degner for at least the same reasons that Claim 1 is patentable. The subject matter recited in independent Claim 21 and in dependent Claims 23 and 25, and in independent Claim 30 also is patentable over the applied references.

Therefore, withdrawal of the rejection is respectfully requested.

Second Rejection of Claims 3 and 32-36 Under 35 U.S.C. § 103

Claims 3 and 32-36 stand rejected under 35 U.S.C. § 103(a) over Murai in view of Degner, and further in view of Saito. The reasons for the rejection are stated on pages 9-10 of the Official Action. Claim 32 has been cancelled. This rejection is respectfully traversed.

As explained above, Murai's apparatus does not include a showerhead electrode. Degner and Saito provide no motivation to modify Murai's electrode to produce a showerhead electrode, much less a showerhead electrode comprising the combination of features recited in Claim 1. Therefore, dependent Claims 3 and 34 also are patentable over the combination of Murai, Degner and Saito for at least the same reasons that Claim 1 is patentable.

Dependent Claims 33 and 36 are also patentable for at least the same reasons as those stated above for independent Claim 30. Dependent Claim 35 also is patentable for at least the same reasons as those stated above for independent Claim 21.

Therefore, withdrawal of the rejection is respectfully requested.

First Rejection of Claims 1, 3-10, 21, 23, 25, 27, 30 and 32-36 Under 35 U.S.C. § 103

Claims 1, 3-10, 21, 23, 25, 27, 30 and 32-36 stand rejected under 35 U.S.C. § 103(a) over Saito in view of Degner. The reasons for the rejection are stated on pages 10-14 of the Official Action. Claims 23 and 32 have been cancelled. The rejection is respectfully traversed.

Saito does not suggest an electrode having a thickness of about 0.3 to 0.5 inches. However, it is asserted in the Official Action that it would have been obvious to modify Saito's electrode in view of Degner to have a thickness of about 0.3 to 0.5 inches. However, for reasons stated above, including that Saito discloses an electrode that is even thinner than a conventional electrode, Degner fails to suggest modifying Saito to provide the thick silicon electrode recited in Claim 1.

Also, the unexpected results presented in the Hubacek Declaration that are achieved by the subject matter recited in Claim 1 rebut any alleged *prima facie* case of obviousness over the combination of Saito and Degner. Thus, Claim 1 is patentable over Saito and Degner.

Dependent Claims 3-10, 27 and 34 also are patentable over the cited references for at least the same reasons that Claim 1 is patentable. Independent Claim 21 and dependent Claims 23, 31 and 35, and independent Claim 30 and

dependent Claims 33 and 36 also are patentable over the applied references for reasons stated above.

Therefore, withdrawal of the rejection is respectfully requested.

Second Rejection of Claims 1, 3-10, 21, 23, 25, 27, 30 and 32-36 Under 35 U.S.C. § 103

Claims 1, 3-10, 21, 23, 25, 27, 30 and 32-36 stand rejected under 35 U.S.C. § 103(a) over Degner in view of Saito. The reasons for the rejection are stated on pages 14-16 of the Official Action. Claims 23 and 32 have been cancelled. The rejection is respectfully traversed.

As acknowledged in the Official Action, Degner fails to disclose a single crystal silicon electrode having an electrical resistivity of less than 0.05 ohm-cm. However, it is asserted in the Official Action that Saito discloses this claimed feature and that it would have been obvious to modify Degner's electrode to have the recited electrical resistivity.

Applicants respectfully submit that the combination of Degner and Saito does not suggest modifying Degner's electrode plate to produce a silicon electrode having both the electrical resistivity and thickness recited in Claim 1. Also, the unexpected results presented in the Hubacek Declaration that are achieved by the subject matter recited in Claim 1 rebut any alleged *prima facie* case of obviousness over the combination of Degner and Saito. Thus, Claim 1 is patentable over these references.

Dependent Claims 3-10, 27 and 34 are also patentable for at least the same reasons as those stated for Claim 1. Independent Claim 21 and dependent Claims

Conclusion

For the foregoing reasons, withdrawal of the rejections and prompt allowance of the application are respectfully requested.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

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By: _____

Edward A. Brown
Registration No. 35,033

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620